

Appl. No 10/660,922
Amdt. Dated June 10, 2005
Reply to office action of May 24, 2005

Amendments to the Specification

Please replace paragraph [0015] with the following amended paragraph:

[0015] Two seedling extractors are installed at each tray holder. Closing an isolation valve connected to the appropriate cam follower switch may turn one of these off, depending on whether it is desired to plant one or two rows of seedlings in the growing field soil between furrows. When 2 rows are being planted, the timing of the ~~cam~~ cam switches provides for staggering the spacing of the plantings between rows.

Please replace paragraph [0017] with the following amended paragraph:

[0017] The seedling extractor handler blade sloped portion has two normal positions, open and closed. ~~In the~~ a closed position, where the blade is within the extension tube. ~~In this position,~~ the sloped portion is pressing against the extension tube inside wall forcing the opposing blade seedling grasping portions together so the ends converge and substantially touch. In the open position the handler blades have the sloped portion outside the extension tube. The sloped portions spring apart moving the opposing blade seedling grasping portions apart so the ends diverge. In this position, the retaining pin is located so that the spring end sliding motion within the extension tube is stopped and the handler blade is retained within the extension tube in the open position.

Please replace paragraph [00120] with the following amended paragraph:

[00120] Figure 1 shows a perspective view of a section of the apparatus showing the major components. The complete apparatus contains several sections like the one shown. The components are mounted on the frame (100) and the frame acts to maintain them in their operating relationship. The seedling tray holder (150) supports the trays of seedlings in an essentially vertical position and allows vertical movement of the tray. ~~The tray~~ trays are moved vertically, one row of seedling cells at a time, by the seedling tray advance cage (172). The tray holder is mounted by rollers to the frame so it may move laterally in response to motion of the seedling tray lateral motion mechanism (190) which is flexibly connected to the outer seedling tray holders on the apparatus. A flexible cable connection is shown in figure 1. The cooperative movement of the tray advance mechanism and the tray advance mechanism move a tray one

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seedling cell at a time from a starting reference point until the last cell in the tray is reached and then the tray is lowered vertically one row and the lateral motion resumed in the opposite direction, one cell at a time. A tall seedling bender bar (166) catches the tops of tall seedlings and keeps them out of the way of the extractors (210). Two seedling extractors are installed facing the seedling tray. The extractor blades (220) move along a slot in a track (240) that moves the extractor seedling handler blades at an angle to the vertical except for a horizontal linear portion of travel in the slot (241) that moves the blades in and out of the seedling cell in the tray. The reference point(s) for the tray holder are the seedling extractors (210). The extractor enters a seedling tray, grasps the seedling root ball, removes the root ball from the tray, moves the root ball over the seedling guide chute (250) and releases the seedling into the chute receiver end (258). The seedling drops down the chute until it lands on the kicker (252) that is positioned on the guide chute kicker end (260). The seedling planting mechanism (270) is adjustably mounted on the frame to accommodate differing planting filed furrow depths. It has a furrow shaper shoe (272) that forms a small furrow with a cross-section shaped like the seedling ball as the apparatus moves forward. The kicker swings on an operating shaft to dislodge the seedling and drop it into the furrow in the interior of the furrow shaper shoe. The end of the kicker is bent and formed in the shape of the furrow shaper so when the kicker returns to its original position the seedling is up righted in the furrow. The forward motion then allows the furrow closure plates (274) to move the disturbed soil around the seedling in the furrow.

Please replace paragraph [00128] with the following amended paragraph:

[00128] The seedling tray holder (150) consists of an inlet support (154), an intermediate support (156) and a lower support (160). Figure 4 shows the holder with 1 seedling tray in the holder being held on the bottom by the intermediate and lower supports. The rectangular tray is also supported at the tray edges by the tray guides (162), shown in figure 2, and supported on the top by the tray hold-down strips (164), also shown in figure 2. Figure 4 shows a second tray being inserted into the tray holder and guided by the upper support. An operator or operators standing on the working surface (106) would insert this second tray so the apparatus may plant seedlings continuously.

Please replace paragraph [00130] with the following amended paragraph:

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[00130] The extractor (210) removes one seedling at a time from the seedling tray and moves it to the lower position shown by dotted lines in figure 4. This lower ~~position~~ position is over the chute receiving end (258), where the seedling is released and drops into the chute as shown in the figure. The seedling tray holder then moves the seedling tray one seedling cell either to the left or right, depending on which side of the seedling tray the seedling removal began. The extractor then returns to the seedling extraction position, shown by solid lines in figure 4, and removes the next seedling. In the event there are seedlings that have grown so tall as to interfere with extractor operation, a tall seedling bender bar (166) is provided to catch the top of the tall seedling and keep it from interfering with the extractor operation. The extractor consists of a housing (212) an extension tube (214), a control rod arranged with an adjustable fixed length (216), a control rod end arranged to travel in a slot in the extension tube, and extend beyond the slot when the extension tube is fully in the housing (218), a seedling handler (220), a drive mechanism (236) with a cylinder and piston (238) that is connected (242) to the housing and extension tube. The connection to the extension tube has a long pin (244) that has its end inserted in a slot in the drive track (240). The pin moving in the drive track slot guides the extractor housing and extension tube in a sloping direction as it moves up and then when it is horizontal, it guides it in linear motion toward and away from the seedling tray. The extractor has a seedling handler (220) inside the extension tube. The handler has two normal positions, open and closed. It is in the open position during the linear motion into the seedling tray cell and moves to the closed position when fully inserted in the seedling cell, grasping the seedling ball. The handler remains in the closed position until it is near the end of downward travel, and located over the chute receiving end where it opens. It then remains in the open position for the upward travel and linear travel into the next seedling tray cell.

Please replace paragraph [00131] with the following amended paragraph:

[00131] The opening and closing of the extractor handler blade is illustrated in figures 5A and 5B. These figures show the extractor housing (212), the extension tube (214), the two sides of the seedling handler blade (220), the handler retaining pin (228), the control rod end (218), the release bushing (230), the spring guide rod (232) and the release spring (234). The view of figure 5A and 5B is a bottom view cross-section taken at the centerline of the extractor. In figure 5A the handler blades are in the open position, and in figure 5B the handler blades are in the closed

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position. The figures show the handler blade is configured with a blade portion (220), a sloping portion (222), a converging-diverging portion (224), and a u-shaped spring end (226).

Please replace paragraph [00145] with the following amended paragraph:

[00145] The seedling tray holders are adjusted to fit the seedling tray size in use, and the seedling trays are installed in the holders with the first row of seedling cells resting on a bar of the seedling tray advance mechanism advance cage. The tray cell spacing configuration is set using the control system ~~stroke~~ stroke length adjustment and checked by manually advancing the tray using the manual control switches. The extractors are then aligned at the first seedling in the first row using these manual switches. Two rows of seedlings between planting field furrows are planted if the control valves for all extractors are in the open position. If desired to plant only one row, the control valve for the second extractor serving each seedling tray holder is placed in the closed position.